

This observation represents either a late-winter emergence of a hatchling that overwintered in the nest or the emergence of a hatchling that entered a terrestrial overwintering site after emergence from the nest the previous August or September. Either may be correct because Lawler & Musick (1972) described a juvenile with two lines of arrested growth that was overwintering in a dune 0.3 m below the surface in Gloucester County, Virginia. It was found on 7 November 1967, reburied, and emerged naturally on 23 April 1968. Terrapins raised in artificial impoundments in coastal North Carolina at the turn of the 20th century emerged from terrestrial hibernation in March and April (Coker, 1906). The emergence from a terrestrial overwintering site and activity by this hatchling in late March is also significant because it indicates that these small turtles can initiate activity in cool weather. *Malaclemys t. terrapin* is understudied in the Virginia portion of its range. Additional cool weather observations may reveal other unknown aspects of the behavior and ecology of this species.

LITERATURE CITED

- Coker, R. C. 1906. The cultivation of the diamond-back terrapin. North Carolina Geological Survey Bulletin 14: 1-69.
- Ernst, C. H., J. E. Lovich, & R. W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington, DC. 578 pp.
- Lawler, A.R., & J.A. Musick. 1972. Sand beach hibernation by a Northern Diamondback Terrapin, *Malaclemys terrapin terrapin* (Schoepff). Copeia 1972: 389-390.
- Mitchell, J. C. 1994. The Reptiles of Virginia. Smithsonian Institution Press, Washington, DC. 352 pp.
- Joseph C. Mitchell
Department of Biology
University of Richmond
Richmond, Virginia 23173
- Pamela Denmon
U.S. Fish and Wildlife Service
Eastern Shore of Virginia/Fisherman Island
National Wildlife Refuge
5003 Hallett Circle
Cape Charles, Virginia 23310
- Banisteria*, Number 26, 2005
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- WINTER ACTIVITY BY AN EASTERN BOX TURTLE (*TERRAPENE CAROLINA CAROLINA*) IN VIRGINIA -- Lepidosaurian reptiles and turtles normally limit activity in cold weather because they are ectothermic. These animals are usually dormant during winter months in the Northern Hemisphere, but several reports, including some from Virginia, demonstrate that reptiles may be active during cold periods. Mitchell (1994) summarized cold-weather observations on Virginia reptiles published prior to that date. Winter-active reptiles that have been reported since then include an Eastern Wormsnake (*Carphophis amoenus*) by Mitchell & Kirk (1996), a Northern Black Racer (*Coluber constrictor*) by Church & Mitchell (2003), and Eastern Ratsnakes (*Elaphe [obsoleta] alleghaniensis*) by Bulmer & Cheroke (1998).
- Turtles basking on logs in lakes and ponds are frequently observed on sunny days in the Virginia Coastal Plain when winter temperatures are about 10-16° C (Mitchell, 1994, unpublished). Terrestrial winter activity is far less common for turtles. Mitchell (1994) and Boucher (1999) noted that all activity records known for *Terrapene carolina* in Virginia were from March to December. Drotos (1974) listed an activity period for this species of 5 May to 31 October in Prince William Forest Park in Prince William County. Hunley (1998) reported an Eastern Box Turtle (*T. c. carolina*) active on a college lawn in Roanoke at an air temperature of 10° C on 8 February 1998. This terrestrial turtle becomes inactive during winter months by burying completely or partially under leaf litter and to depths of several cm in the ground (Ernst et al., 1994; Mitchell, 1994; Dodd, 2001). The record depth of 48 cm was in Illinois (Cahn, 1937). In northern states, box turtles can withstand freezing of nearly 58% of their extracellular body fluids for up to 4 days and still recover (Costanzo & Claussen, 1990). Observations of active box turtles at cold temperatures are of interest because they show the range of environmental conditions within which these reptiles may be active in winter. This note describes a turtle found completely exposed at freezing temperatures in southeastern Virginia.
- On 11 February 2005, I observed an adult male *T. c. carolina* sitting in the open on the ground with head and limbs partially retracted into its shell at 1045 h EST at a site about 5.0 km NNE Rushmere, Isle of Wight County, Virginia (37° 06' 37.29" N, 76° 39' 56.64" W).

The habitat was a small clearing in mixed 10-12 year old Loblolly Pine (*Pinus taeda*) and young hardwoods. The turtle was completely exposed to the ambient environment sitting on bare soil next to a small clump of grass. Air temperature when it was found was 1.7° C (EnviroSafe field and lab thermometer, Forestry Suppliers, Inc.). I hypothesized that this turtle had been active near his hibernaculum on 8 or 9 February when air temperatures approached the low 20s °C in this area. He may have been in the open away from cover when the temperatures dropped to below about 4-5° C at night. Air temperatures on the morning of 11 February dropped below freezing (-2.2° to -1.1° C); a thin layer of ice was on a shallow pool of water in a road rut about 30 m away. The turtle was alert, appeared healthy, and lacked any nasal discharge; withdrawal of its legs and head into the shell did not produce any audible wheezing or visible bubbles from the nose. I subsequently moved the turtle to cover beneath a layer of leaf litter.

Natural emergence from hibernacula in Mason Neck National Wildlife Refuge in Fairfax County, Virginia, for males was from 21 March to 5 April and females from 6 March to 11 April (Boucher, 1999). He noted that some turtles were alert during hibernation and that cloacal temperatures ten days prior to emergence were 3.8-13.2° C. The lowest hibernaculum temperature he recorded was 2.5° C; soil temperatures were 2.5 to 12.8° C upon emergence. Boucher (1999) did not note winter mortality but Allard (1948) observed box turtles from Virginia and Maryland that were occasionally killed by sudden freezes in winter and late spring.

My observation suggests that *T. c. carolina* can withstand being exposed to freezing temperatures in southeastern Virginia. Eastern Box Turtles from Virginia may have a freeze tolerance similar to that reported for *Terrapene* in the upper Midwest (Costanzo & Claussen, 1990; Costanzo *et al.*, 1993).

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LITERATURE CITED

- Allard, H. A. 1948. The Eastern Box Turtle and its behavior. *Journal of the Tennessee Academy of Science* 23: 307-321.
- Boucher, T. P. 1999. Population growth and thermal ecology of the Eastern Box Turtle, *Terrapene carolina carolina* (L.), in Fairfax County, Virginia. Ph.D. Dissertation, George Mason University, Fairfax, VA. 228 pp.
- Bulmer, W., & M. Cherok. 1998. El Niño and January herp activities. *Catesbeiana* 18: 43-44.
- Cahn, A. R. 1937. The turtles of Illinois. *Illinois Biological Monographs* 16: 1-218.
- Church, D., & J. C. Mitchell. 2003. Natural history: *Coluber constrictor constrictor* (Northern Black Racer), Winter activity. *Herpetological Review* 34: 62-63.
- Costanzo, J. P., & D. L. Claussen. 1990. Natural freeze tolerance in the terrestrial turtle, *Terrapene carolina*. *Journal of Experimental Zoology* 254: 228-323.
- Costanzo, J. P., R. E. Lee, Jr., & M. F. Wright. 1993. Physiological responses to freezing in the turtle, *Terrapene carolina*. *Journal of Herpetology* 27: 117-120.
- Dodd, C. K., Jr. 2001. North American Box Turtles, A Natural History. University of Oklahoma Press, Norman, OK. 231 pp.
- Drotos, E. J. 1974. Natural history notes. The box turtle. *Virginia Wildlife* (May): 7-8.
- Ernst, C. H., J. E. Lovich, & R. W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington, DC. 578 pp.
- Hunley, W. J. 1998. Field notes: *Terrapene carolina carolina*. *Catesbeiana* 18: 18.
- Mitchell, J. C. 1994. The Reptiles of Virginia. Smithsonian Institution Press, Washington, DC. 352 pp.
- Mitchell, J. C., & D. Kirk. 1996. Field notes: *Carpophis amoenus amoenus*. *Catesbeiana* 16: 13-14.
- Joseph C. Mitchell
Department of Biology
University of Richmond
Richmond, Virginia 23173